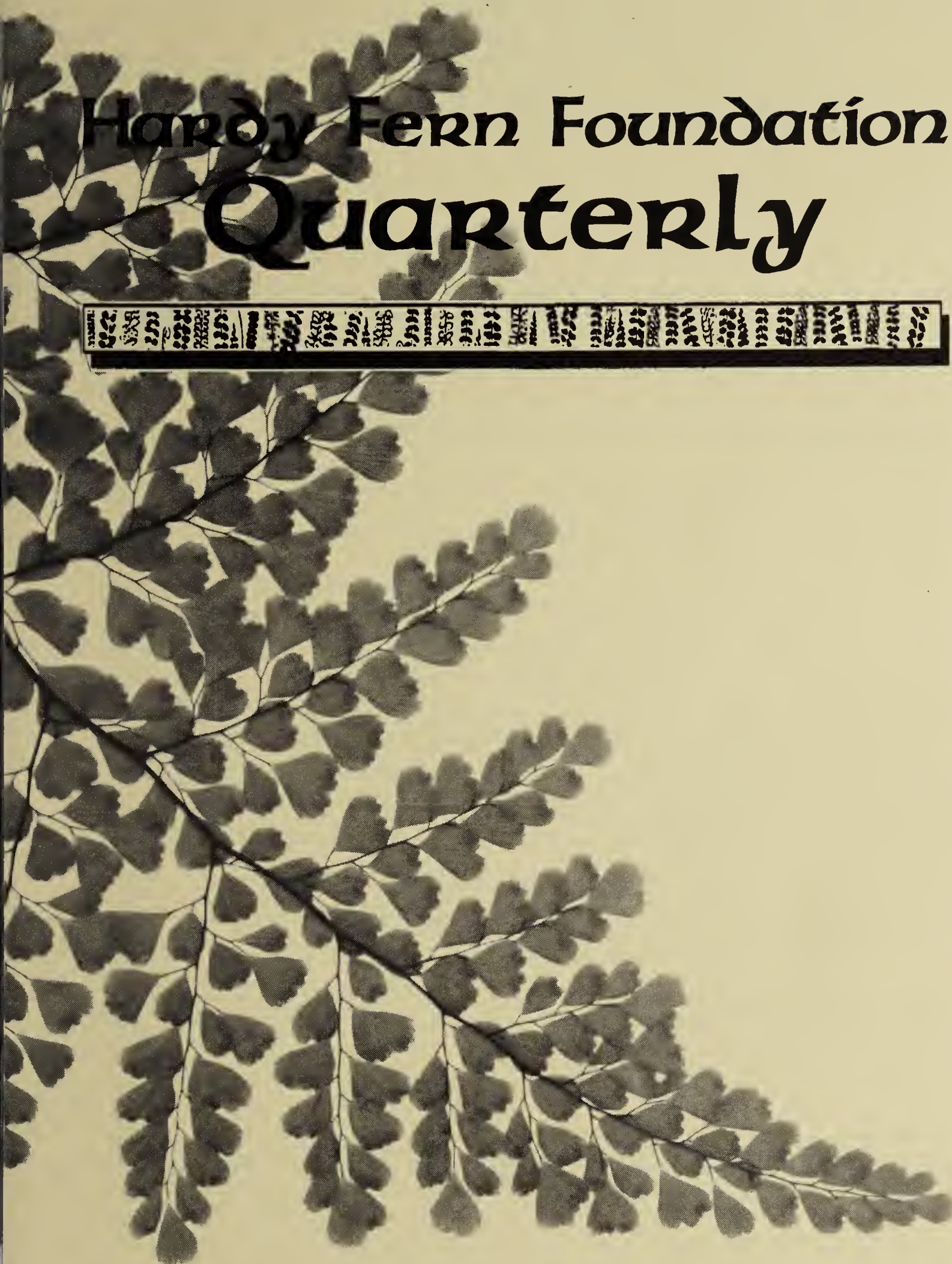
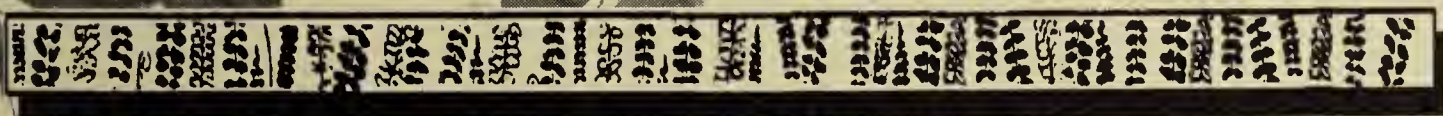


Hardy Fern Foundation Quarterly



THE HARDY FERN FOUNDATION

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The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Stephen Austin Arboretum, Nacogdoches, Texas, Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, Sacramento, California, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Coastal Maine Botanical Garden, Wiscasset, Maine, Inniswood Metro Gardens, Columbus, Ohio, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Lakewold, Tacoma, Washington, Les Jardins de Metis, Quebec, Canada, University of Northern Colorado, Greeley, Colorado, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

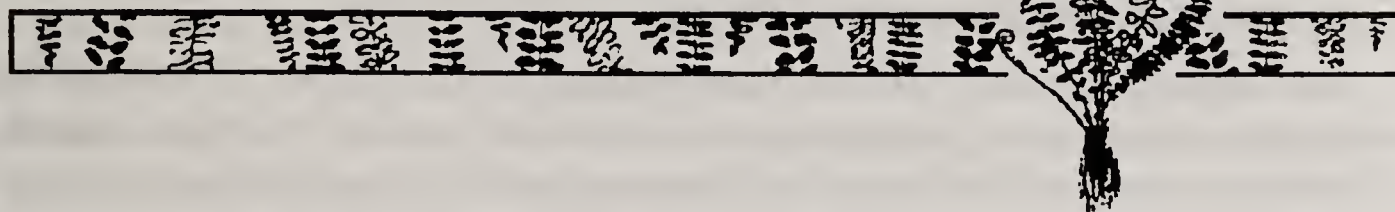
Cover Design by Willanna Bradner.

HARDY FERN FOUNDATION QUARTERLY

THE HARDY FERN FOUNDATION

QUARTERLY

Volume 9 • No. 1 • Editor Sue Olsen



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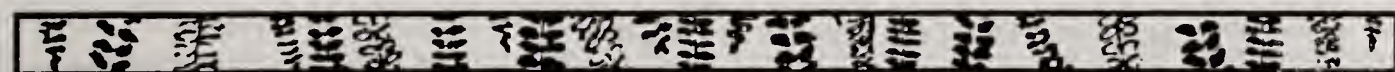
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President's Message

Anne Holt

At this time of year I begin to yearn for spring. How fortunate we are not to be buried under four feet of snow with temperatures in the minus degrees. At this moment I am looking at some fronds that need to be cut down to make way for the new ones that will appear in the not too distant future.


The Northwest Flower Show will soon be upon us running Feb. 17 through Feb. 21 at the Convention Center in downtown Seattle. I can remember attending that show one year with snow on the ground outside—a magical contrast to the spring blooms inside. Look for the Hardy Fern Foundation display on the educational floor together with the Rhododendron Species Botanical Garden display. There in addition to seeing an assortment of ferns, you can also find lists of hardy ferns and their sources. There are still openings for volunteers at our booth. To help please call Glenn Youell at 425-885-6387. Remember your help entitles you to free admission to the show.

The Hardy Fern Foundation will also have a display table at the 5th International Rhododendron Species Symposium and American Rhododendron Society's convention in Bellevue, WA from April 27 to May 3. We hope to meet some of our out of town members there.

For those of you who are interested in more tender ferns, see the November issue of *Gardens Illustrated* for an article about British fern expert Martin Rickard and his Kyre Park nursery.

We are pleased to announce that Dr. Herb Wagner of the University of Michigan will be our special speaker at our annual meeting and Fern Festival in June. The festival takes place on Friday June 4 and Saturday June 5 with the lecture on the evening of June 4. Dr. Wagner is the Dean of American pteridologists and an outstanding speaker. We hope many of you will be able to join us.

The spring catalogs are arriving daily and temptation abounds. May our winter become mild after the chills of the last few weeks so that we'll soon be out there trimming back those fern fronds.

**THE HARDY FERN FOUNDATION**
QUARTERLY

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European Fern Gardens Cont.

Sue Olsen, Bellevue, WA

It is difficult to continue describing the gardens we visited without sounding redundant. How many times can I say beautiful, comprehensive and outstanding? And yet that is exactly what these gardens are and why we were very fortunate to have had the opportunity to visit them. There are four more on the tour, yet another two in Northern Germany and two in what was formerly East Germany.

Our friends, Mr. and Mrs. Nittritz once again offered to drive us around, this time to visit the garden of Mr. and Mrs. Helmuth Schmick. The route took us from our home base of Eutin back towards Hamburg through the interesting and historic city of Lubeck. We arrived at the Schmick's in a torrential rainstorm which curtailed photography but not our enjoyment of their plants. Their garden is very pretty and follows an artificial stream down a hillside to a pleasant planting around a serene pond. The garden is framed with rhododendrons and evergreen shrubs and features an extensive collection of *Dryopteris*. The Schmick's winter in South Africa annually and consequently have a number of their natives in cultivation. I was particularly impressed with a planting of *Blechnum punctulatum*. Mr. Schmick is the author of *Farne in Natur und Garten* which we naturally purchased. It is an excellent souvenir of our visit.

Our last stop in Northern Germany was at the garden of Ingo Carstensen. Unfortunately due to a serious accident (the only back up we experienced in all of our weeks of driving in Germany) we arrived very late and did not have nearly enough time to thoroughly explore this interesting garden. When Mr. Carstensen first started landscaping his property he "decorated" it



Blechnum penna-marina and *Gentiana sino-ornata* 'Bellatrix'
Garden of Ingo Carstensen

with conifers, herbs and bulbs and lawn. (He credits childhood visits to the home of his aunt and the fern fields nearby as the inspiration for his love of ferns.) Now there is no lawn but instead a garden dedicated to his chosen specialty, the ferns. The garden completely surrounds the house. In front the plantings are primarily woodland types along with an interesting assortment of *Phyllitis* cultivars. These favorites of his are found throughout the garden and include one of

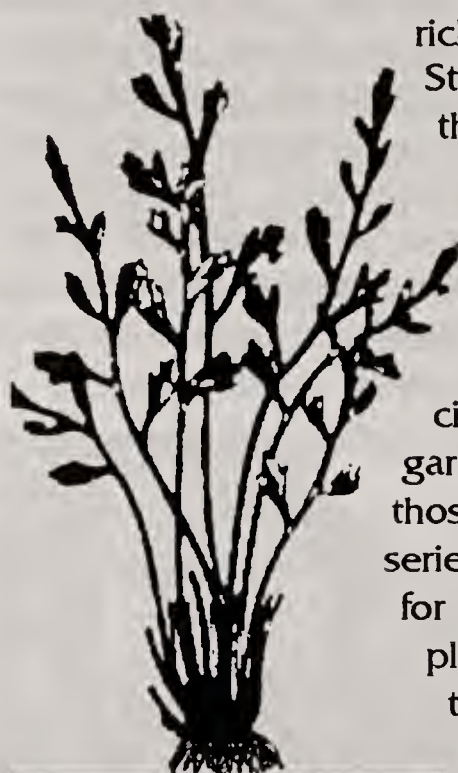
continued on page 2

European Fern Gardens *continued from page 1*

the most handsome plants of *Phyllitis scolopendrium* 'Undulata' that I've ever seen. The side yard is given to rock garden and alpine types nicely presented for close up viewing in a raised bed. His extensive *Asplenium* collection is housed here and includes a nice specimen of the rarely seen *A. x alternifolium*. The back yard is contoured with a series of hummocks housing yet more ferns. My favorite planting in the entire garden was a *Blechnum penna-marina*, *Gentiana sino-ornata* 'Bellatrix' duo that brought me back for "just one more" picture again and again. I can't leave this garden without mentioning a lush stand of *Gymnocarpium oyamense* that was thriving under the protection of leafy evergreens. Mr. Carstensen propagates in his "fern factory"—essentially his old fish tanks which now house his young ferns. His garden is much the

richer for his efforts.

Stefan Jessen gardens at the Arktisch-Alpiner Garten on the outskirts of Chemnitz, and what a garden it is! Mr. Jessen has traveled extensively especially in Eastern Europe in order to collect and conduct research on the native species and hybrids (especially in his special field the *Aspleniums*). In addition he has propagated and published articles on a vast number of species, hybrids and cultivars from around the world. His garden is home to a fascinating collection of over 300 of those species and hybrids. The garden is arranged in a series of berms to reflect the habitat and country of origin for his collection. There is a berm for limestone loving plants from Yugoslavia, for example, and so on around the world. His collection of challenging alpine European *Asplenium* hybrids is incredible and one regrets

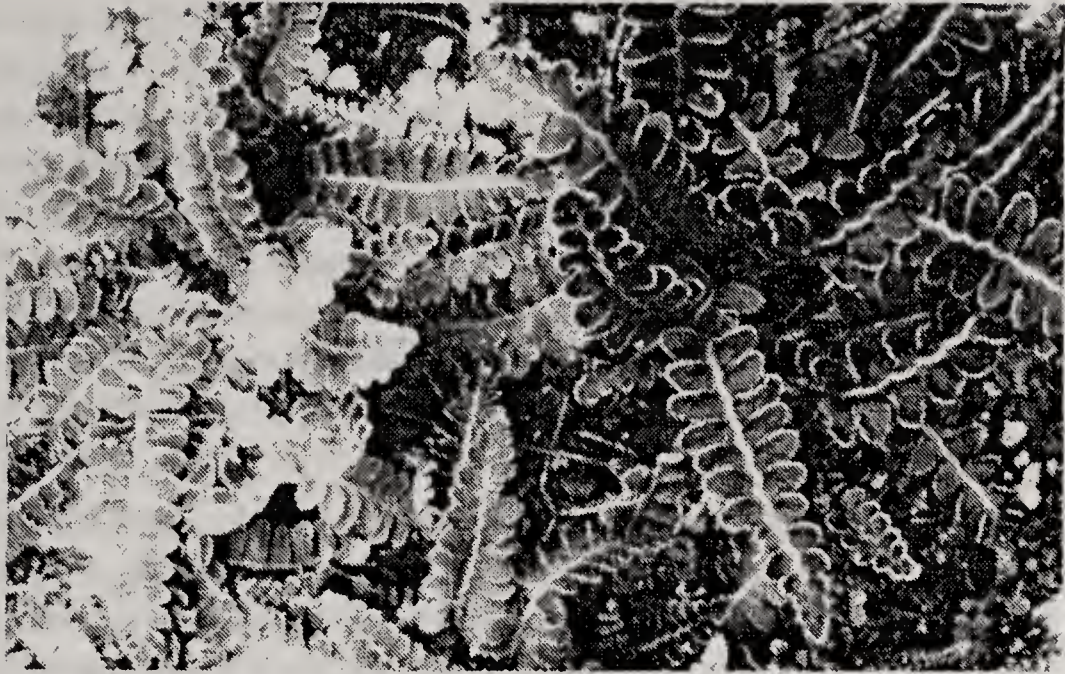


Asplenium x alternifolium

that so many of them are sterile. The parentage also gets a bit complicated, but following in the footsteps

of the late Prof. Tadeus Reichstein, Mr. Jessen continues to study and sort these *Aspleniums* and their interrelationships. His inventory includes no less than nine nothospecies mostly subspecies of *A. trichomanes*. Mr. Jessen speaks only a very little English and to my regret I speak no German leaving me with far too many unanswered questions. Fortunately like the other hosts he provided me with a print-out listing the ferns in his garden -- botanical names are after all an international language. The list was also especially helpful in that it referenced the countries of origin for each plant as well as whether the hybrids are sterile or fertile.

Our tour concludes with a visit to the garden of Mr. and Mrs. Christian Kohout of Prietitz, Germany (north of the interesting city of Dresden). Mr. Kohout is the son of a gardener and has a life time of experience with and enthusiasm for plants. He and his brother own a nursery/garden center offering a broad range of handsome and well tended plants in town. Mr. Kohout lists as his favorite plants primroses, trilliums and ferns. However, upon entering his private garden it was immediately apparent that ferns are THE favorite. We were greeted by an



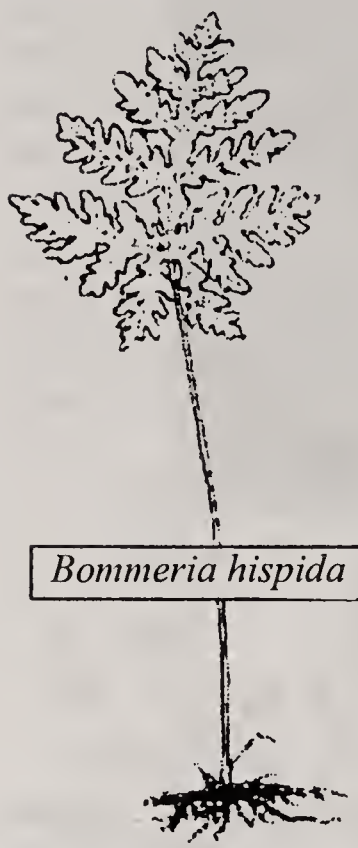
Ceterach officinarum subspecies *bivalens*
Garden of Christian Kohout

impressive and artistic arrangement of non hardy species and cultivars, including some especially handsome tree ferns, that had been grown to perfection in his greenhouse. Counting the tree ferns, hardy ferns, cultivars and hybrids Mr. Kohout lists an unbelievable 622 ferns in his collection. Like Mr. Jessen's this garden is arranged in a series of carefully designed habitats to simulate appropriate natural sites for each plant. As in every garden in our travels I was particularly taken by the vigor of the alpines and yes again this features the *Aspleniums* including an assortment of subspecies. The *Cheilanthes* and *Ceterach* plantings were also impressive especially a robust colony of *C. officinarum* subspecies *bivalens*. I was also very pleased to see a number of species which I had not yet been able to test for hardiness, such as *Polystichum richardii* and *P. acutidens*, growing quite happily in the woodland garden. Their winter temperatures can go down to 12° F (-10° C) so I am encouraged by the potential for the use of these ornamentals here in our gardens. Finally I must once again mention the hybrids that are so much a part of the gardens here. The late Dr. Anne Sleep and the late Prof. Tadeus Reichstein, among others, created a number of experimental *Polystichum* hybrids beginning in the 1960's. These have slowly made their way into European gardens (and those that can be propagated by bulbils are gradually making it to the U.S.) Mr. Kohout has a full dozen of these. His *Polystichum acrostichoides* x *P. andersonii* which has the bulbil of *P. andersonii* and constricted tip of *P. acrostichoides* is especially handsome. Once again the language barrier made discussion difficult, and somewhat frustrating. However, being in such a beautiful garden was indeed a reward in itself.

I thank all of these gracious hosts for sharing their truly remarkable gardens, plants and spores and time with us. I hope someday to share our gardens in the United States in return. Meanwhile, I hope you, the readers have enjoyed the visits as well.

Big Bend National Park

Ann Herrington, Garland, TX



Nine hardy (double entendre intended) fern seekers gathered in Fort Stockton, Texas on Saturday, May 16 to begin a journey to Big Bend National Park, 125 miles to the south. Big Bend lies in the northernmost part of the Chihuahuan Desert, an area of mountains and flatlands, incredible formations and colors, and extremely interesting vegetation and wildlife.

Our home until Tuesday was the Chisos Mountains Lodge at the Basin, with an elevation of 5400 feet. The Basin is ringed with mountains, hence the name. We knew we weren't in Dallas anymore when we saw signs warning of bears and mountain lions. (Don't take small children on the trails. Stay in groups.)

If you see a mountain lion, stay with your group and wave your arms in the air to make the group look larger. Don't run. Do not crouch down; the lion has seen you long before you saw it! If the lion behaves aggressively, throw stones or sticks.) Big Bend is in its sixth year of drought, and the animals are seeking food and water, even if they have to go into inhabited areas.

Because of the drought, we had the challenge of finding xeric ferns in their "dry" mode. Our first day's hike was on the Lost Mine Trail, which climbs along a well-maintained trail to an incredible view of "the Window" and beyond. The ground is rocky, but a surprisingly large number of plant species grow here, including the beautiful Texas madrone. The fern find of the day was the delightful little *Bommeria hispida*, which forms a 2" high carpet of horizontal hand-shaped fronds during wetter times, but which had its little fronds brown and folded, trying to conserve moisture and stay alive until the rains come. We also saw *Astrolepis sinuata* (this one used to be classified as *Notholaena sinuata*), *Cheilanthes eatonii*, *Pellaea atropurpurea*, *Pellaea intermedia*, and a *Woodsia*, probably *W. mexicana*, since it is listed by Correll (*Ferns and Fern Allies of Texas*) for this area. All of them were crispy brown because of the drought, but alive. It's interesting to see them in this condition, and know that they will green up when they are watered.

A few days later a woman with three children was attacked by a mountain lion on this trail, and the trail is closed now.

We had heard of an area with a waterfall that had ferns growing at the bottom of the falls, and that was our destination on Monday. The beginning of the trip didn't look promising. We drove several miles from our mountain lodge down to the flatlands on a nice paved road, then turned onto a rock/dirt road and drove for what seemed like a very long time, because we were going really, really slowly, but it probably wasn't more than a mile or two. Then the hike toward the mountain began. We were on the lookout for critters (especially snakes) but all we saw that was linear were a couple of enormous centipedes.

The sun was getting hotter and hotter, and the trail became steep. We were carrying plenty of water, but wondering if it would last until we could get more. We passed quite a few xeric ferns--the narrow-fronded *Astrolepis cochisensis*, the wider-fronded *Astrolepis integerrima*, and *Astrolepis sinuata* again. In addition to the *Cheilanthes eatonii* which we found on the Lost Mine Trail, we also saw *Cheilanthes alabamensis* and *Cheilanthes tomentosa*. *Selaginella wrightii* was abundant in some areas, growing on rocks and boulders exposed to full sun--hot and bright. Frequently a nice clump of ferns was growing in a nice clump of cactus. Anyone who thinks of ferns as delicate plants needs to see them growing in these conditions.

A thrill on this trail was finding *Notholaena standleyi* (which is built roughly on the same plan as *Bommeria hispida*) and *Notholaena aliena*. The xeric ferns are often found at the base of large boulders, with their roots growing under the boulders or in fissures, and their fronds exposed to full sun. The roots can grow quite long in their search for coolness and moisture under and between boulders.

The trail became narrower, steeper, and more winding. We rounded a corner, and saw below, in a box canyon, a mass of greenery in the midst of the dry, brown, rocky landscape. Suddenly revived, we quickly made our way to a magical, cool oasis, complete with tall green trees hanging over spring-fed pools which were lined with perfect, luscious maidenhair ferns (*Adiantum capillus-veneris*--the southern maidenhair). Adding color to the scene were beautiful yellow Texas columbines in full bloom. The waterfall wasn't falling, because of the drought, but the springs kept the area lush and green. What a rich reward for our hiking efforts!

In the afternoon we drove to the Rio Grande river, which defines the border between Texas and Mexico, and whose "U" shape around the tip of Texas gives the Big Bend area its name. We stopped at an overlook to get our first peek at the river. The car thermometer registered 115 degrees. The area was treeless, rocky, totally exposed to the sun, barren at first glance. Then we got out of our cars, and practically stepped on *Selaginella lepidophylla*, the so-called resurrection fern! We weren't looking for it, and had never seen it growing anywhere other than in a dish of water in a tourist shop beside curled-up dried ones for sale. It was such a thrill to find them growing naturally. We returned to our cars and as we drove along the road, we began seeing masses of the selaginellas growing among the rocks, sometimes large ones 10-12" across. The area had had a bit of rain the night before, and the selaginellas were uncurled, bright green, growing so thickly that they frequently overlapped each other. Also growing among the boulders here were *Astrolepis integerrima* and *Astrolepis windhamii*, tough upright xerics that have adapted to a really harsh environment where they never know when their next drink of water will come.

Never pass up an opportunity to visit this fascinating place. You'll see ferns you've never seen before, and make lifetime memories.

The preceding text, plus pictures, is available at
<http://web2.airmail.net/lhp/swfs/ftbigbnd.html>

Athyrium Filix-Femina

James Horrocks, Salt Lake City

The first order of business is to note that there is no "e" in "filix". Felix is a cartoon character! Many nurseries make this mistake and even some authors of fern books have done so. "Femina" refers to female and hence "Lady" fern is derived. The name Lady Fern has been used for a long time as a common name for the *Athyriums*, but the actual meaning or reason for using it has been lost. Mickel mentions, tongue-in-cheek, some rather implausible explanations. He writes, "As a mnemonic device, it has been suggested that the arching sori resemble the eyebrows of a fair maiden. Still others waggishly point out that the extreme variability of the lady fern is not unlike a woman's changing mind, but I have been advised not to pursue this." I, likewise, will wisely steer clear of such a notion! Perhaps the grace and beauty of the Lady Ferns suggests why they are called such. At least that is my wife's opinion.



Athyrium filix-femina

The Lady Ferns seem to represent a complex of sorts. Lellinger, Rush, Foster, and others have treated them as a single species with several varieties or subspecies involved. Wherry regarded the Lady Ferns of North America as three distinct taxa and points out the obvious differences quite well in *The Fern Guide*. More recently, Mickel treats them as Wherry does and adds a fourth European species. According to Mickel, *A. filix-femina* is strictly a denizen of Europe and Asia. It differs from the American species by having an erect rhizome which can in time grow up out of the ground. The North American species, *A. angustum* of the northeast differs in that its rhizome is short-creeping rather than erect. The same is true of the Southern Lady Fern, *A. asplenoides*, which also has spores that differ considerably. The third North American species, *A. cyclosorum*, has rather compact rhizomes that send up a vase of fronds that can reach immense size. The sori vary from the typical hooked or J-shape to rounded or horseshoe-shaped, hence the name "cyclosorum". As we shall see, there is ample reason for classifying them as separate species.

It is obvious that the Lady Ferns can be mistaken for each other unless there is close inspection and some knowledge of their differences. They can also be confused with *A. alpestre (distentifolium)*, the Alpine Lady Fern, but in this species, there is no indusium covering the sori and the fronds have a skeletal appearance. *A. alpestre* is also mainly a western fern in North America, being disjunct in Ontario and Quebec, Canada.

Description: The fronds of all Lady Ferns are rather delicate and easily broken. They lack the strengthening fibers found in species of the genera *Dryopteris* and *Polystichum*, which are much sturdier. All Lady Ferns are deciduous.

In *A. filix-femina* of Europe and Asia, the rhizomes are erect or ascending and branching with age. They are covered with dark brown scales and display the old frond bases. The European species produces fronds from one to four feet or so in length, being feathery and lance-shaped. They are bipinnate-pinnatifid and rather thin textured. Dark brown scales are found on the stipe. The sori are J-shaped which is fairly typical of most *Athyrium*s.

The European form has given rise to literally hundreds of cultivars which may be large or dwarfed, cruciate or crested, plumose or undulating. The type plant itself can be variable enough so that no two plants in a colony are exactly alike.

The Northern Lady Fern, *A. angustum*, of northeastern North America produces fronds up to three feet long with sterile pinnules broader than the fertile ones. The elongate sori are very often hooked over the veins, so to speak. The sporangia, when mature, coalesce. The spores are yellow. The rhizome is very different from the European species, being horizontal, short-creeping and spreading. The rhizome is covered thickly with old frond bases. A form "rubellum" is recognized with reddish stalks.

In the Southern Lady Fern, *A. asplenoides*, the rhizome is also horizontal, short creeping and spreading, but it is not covered thickly by the remnants of old fronds. The fronds, themselves, can be up to three feet in length. They are triangular in outline, being widest about the second pinnae-pair. The basal pinnae can be very nearly as long. The pinnules have small superior auricles. The stipe can be nearly as long as the blade, covered with sparse pale brown scales. The sori are either short and straight or longer and conspicuously recurved. The indusia are ciliate with gland-tipped hairs. The spores have a wrinkled (rugulate) blackish outer coat and are dark in color.

Athyrium cyclosorum, as the species name implies, has sori that are often rounded or horseshoe-shaped as well as J-shaped or hooked at one end. This distinguishes the Western Lady Fern from the others. The rhizome is very nearly erect or ascending and compact, producing huge fronds up to eight feet in height. This is the largest of the Lady Ferns. I have encountered large clumps of this magnificent plant measuring five feet across with fronds nearly seven feet high in the Uintah Mountains of Northern Utah. It is chiefly found from the Rocky Mountains westward to the coast, being disjunct in northeastern North America. As in the other Lady Ferns, the fronds are bipinnate-pinnatifid, but taper considerably at the base. The fronds are fleshier and more heavy-textured and a bit lighter green than *A. angustum* or *A. asplenoides*. The stipe sports long pale brown scales. The pinnae are oblong-lanceolate, rather obtuse at the base, and parallel sided, tapering to the apex. The pinnules are lobed and glandular beneath. The indusium is curved and either J-shaped or rounded with flattened marginal hairs, longer than the width of the indusium. The spores are yellow in color. A variety of this species designated "Californicum" is known from western Wyoming, southern Idaho, Utah, New Mexico, Arizona, and California. It differs from the species in the more erect habit and with its narrower leaves. Seville Flowers notes, "Some authorities do not recognize this variety, but in

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New Jersey Pinelands American Fern Society Trip

Joan Eiger Gottlieb, Pittsburgh, PA

Baltimore, Maryland is not exactly the epicenter of pteridology, but it was the site of the 1998 A.I.B.S. (American Institute of Biological Sciences) meetings and the starting point for two great field trips sponsored by the American Fern Society. They will be the subjects of Parts I and II of this report. On August 1st Jim Montgomery (author of *New Jersey Ferns and Fern-Allies*, 1992) was our guide to the somewhat distant **Pinelands** (formerly called the Pine Barrens,) a unique botanical region of a million plus acres - a quarter of New Jersey! It extends in a scatter rug pattern over the outer coastal plain from Ocean to Cape May Counties. This low population oasis within the northeast's "megapolis" became the nation's first "natural reserve" in 1978 with passage of the National Parks and Recreation Act. The legislation set up an unusual arrangement of oversight by the National Park Service coupled with planning input by the New Jersey Pinelands Commission.

Dry, nutrient-poor, acidic, quartz sands of the pre-glacial Cohansey Formation, numerous waterways, frequent fires, bog iron and glass making industries in the past, and logging/agriculture (blueberries and cranberries) today have shaped the flora of this famous region. In upland areas there are forests of mixed pine/oak (pitch, shortleaf, and other pines/black, white, scrub, blackjack, post, and other oaks.) In lowlands distinctive trees such as Atlantic white cedar (*Chamaecyparis thyoides*) and herbaceous gems like bog asphodel (*Narthecium americanum*) border streams, and red maple/black gum/sweet bay dominate hardwood swamps. Floristically fabulous bogs dot poorly drained spots.

The **pine/oak woods** have an understory of various heaths and very few herbs. The only common fern in these dry forests is the ubiquitous bracken, *Pteridium aquilinum*. There is disagreement over whether the differences seen in the populations here represent varieties *latiusculum* (northern-type) and *pseudocaudatum* (southern-type,) or are merely extremes of continuous genetic expression in a polymorphic species. Fertile fronds are known to be produced here, but the specimens we examined during the field trip were all sterile, as has been the unexplained, recent fate of bracken throughout much of its range.

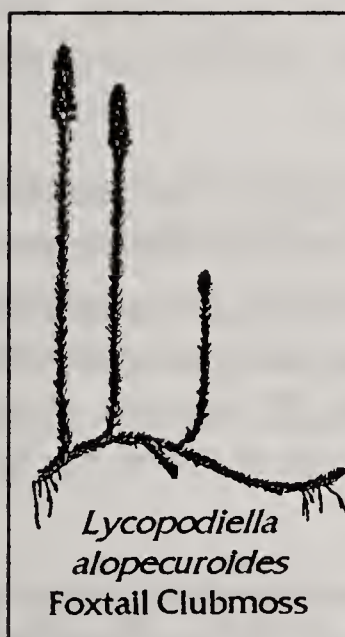
On past forays I visited an unusual **dwarf forest** of about 20,000 acres found in two upland sections of the Pinelands. Called the Upper and Lower Plains, they are separated by the east branch of the Oswego (Wading) River southeast of Chatsworth. As a result of cyclical ground fires that sweep the area every ten years or so, the Plains are covered with elfin-sized pines and pygmy oaks with low, spreading growth forms and heights averaging only a little more than a



Schizaea pusilla
Curly-grass Fern



*Lycopodiella x
copelandii*
Hybrid Bog
Clubmoss



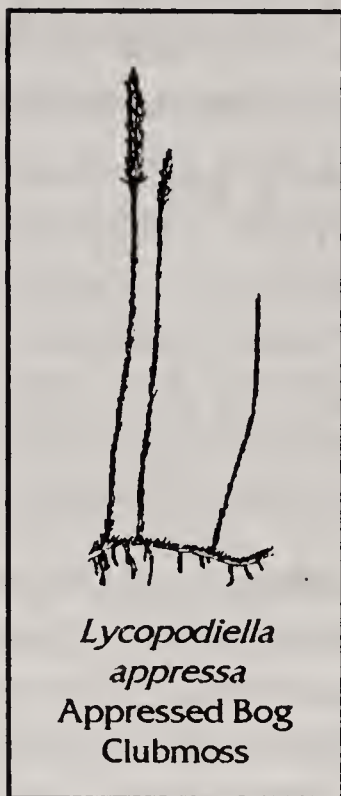
*Lycopodiella
alopecuroides*
Foxtail Clubmoss

meter! It is here that some of the Pinelands most interesting (and rare) ground plants are found, e.g. broom crowberry (*Corema conradii*) at its southernmost location, bearberry (*Arctostaphylos uva-ursi*), the endemic sand myrtle (*Leiophyllum buxifolium*), rock rose (*Hudsonia ericoides* and *H. tomentosa*), March-flowering pyxie“moss” (*Pyxidanthra barbulata*), sweet-“fern” (*Comptonia asplenifolia*), and pine barrens sandwort (*Minuartia caroliniana*.) Common shrubs here include huckleberry (*Gaylussacia frondosa* and *G. resinosa*), and sheep laurel (*Kalmia angustifolia*) among others. It is strange to stand in the midst of this “forest” and tower over its tallest trees.

At **Pleasant Mills** (on S.R. 542) we walked down a rutted sand road behind an 1808 hilltop church to Forge Pond. This **open bog** is surrounded by young Atlantic white cedar, leatherleaf, sweet pepperbush and highbush blueberry (deliciously ripe.) New Jersey’s most famous plant, “curly grass” fern (*Schizaea pusilla*) was quickly found on the hummocky bases of the *Chamaecyparis* trees. In early August its coiled, shoestring leaves form a delicate skirt around stiffly upright, fertile stipes with pale green sporangial masses (modified pinnae) at the tips – a perfect study in elegant miniaturization at a total height of 8-10 cm. Jim Montgomery pointed out that the tiny plants are easier to spot later in the season when the fertile fronds turn cinnamon brown as they mature. The disjunct distribution of this rare fern (southern New Jersey, eastern Long Island, Newfoundland) adds to its mystery and its allure for botanists. Forge Pond offers many other botanical treats; space permits mention of only a few. There are three species of glistening sundew, including the unusual, thread-leaved *Drosera filiformis*, purple pitcher plant, and yellow-flowered bladderwort in the insectivorous category. Other denizens include cross-leaved milkwort (*Polygala cruciata*), golden crest (*Lophiola americana*), redroot (*Lachnanthes tinctoria*), and yellow-eyed grass (*Xyris* sp.) *Sabatia difformis* and pine barrens gentian (*Gentiana autumnalis*) are the gentian family representatives, while spring-blooming orchids include grass pink (*Calopogon tuberosus*) and rose pogonia (*Pogonia ophioglossoides*.) Cranberries bulge

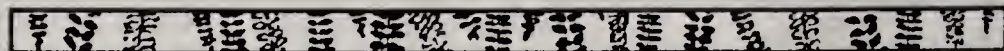
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New Jersey Pinelands American Fern Society Trip *continued from page 9*

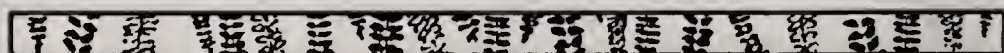


with ripening fruits that seem too big for the tiny-leaved, creeping plants to bear.

For me the major treat at this site was a sizable colony of the hybrid bog clubmoss (*Lycopodiella x copelandii*.) I named this plant in 1956 but had not previously seen it in the wild. It rekindled memories of undergraduate days at the City College of New York when Professor Joseph J.



"We plucked pieces of colorful slag from the stream – remnants of bog iron smelting during the 18th and early 19th centuries when iron in the riverbed gravels was fashioned into cannonballs, cookware and other articles."



Copeland brought in some specimens he collected from a bog near Lakehurst, New Jersey. These included *Lycopodiella alopecuroides*, *L. appressa*, and some plants that looked a little like both. As part of my senior honors thesis I published my conclusion that the strange-looking plants were hybrids - the first to be identified in the "*Lycopodium*" group of fern allies. They were named for the sharp-eyed botany professor who spotted them here in New Jersey, where, happily, they still flourish along with their parents. Although their spores are mostly abortive, the hybrids multiply easily by rhizome branching, arching up into the air for a length (like the *L. alopecuroides* parent) and then plunging to the wet ground, rooting uniformly in it for some distance (like the *L. appressa* parent) - the "inchworm" effect. Their typical hybrid vigor was a joy to behold as large mats of the plants sprawled over the spongy ground at Forge Pond. Another bog clubmoss - *Lycopodiella caroliniana* was present, and fertile, in this bog. It reaches its northern limit near here on Long Island.

Our lunch stop was in Batsto where there is a restored village of old pineland crafts and other activities. A short walk beyond the picnic area leads to a fenced site where the endangered Pickering's morning glory (*Stylisma pickeringii*) is making its apparent last stand. Along County Road 613 two quick stops yielded both of the eastern chain ferns, *Woodwardia areolata* and *W. virginica*, along with lots of *Onoclea sensibilis* for comparison. All three were fertile so the full range of leaf form from monomorphic

(*W. virginica* has sori on the lower surface of ordinary fronds in typical fern fashion,) through partially dimorphic (*W. areolata* has broad green leaves and nar-

rower fertile ones,) to completely dimorphic (*Onoclea* has green vegetative fronds and fibrous, brown [at maturity] ones completely converted into sporangial masses.) The photosynthetic fronds of *Onoclea* and *W. areolata* bear a superficial resemblance, and it was convenient to see them together as part of the herbaceous flora at the edge of a red maple swamp. Massachusetts fern (*Thelypteris simulata*) is found in this area, but time did not permit a search. This is also prime habitat for turkey-beard (*Xerophyllum asphodeloides*) in June.

Our final stop was at the **Mollica River** in the old pinelands community of **Atsion**. The tea-colored water is derived from tannins leached out of accumulated pine needles. We plucked pieces of colorful slag from the stream – remnants of bog iron smelting during the 18th and early 19th centuries when iron in the riverbed gravels was fashioned into cannonballs, cookware and other articles. Old kilns and furnaces can be found throughout the area. Surface waters, albeit acid, were, until recently, safe to drink. They are evidence of the vast, but shallow Cohansy aquifer – a valuable, yet vulnerable 18 trillion gallons of pure water in the most densely settled state in the country. *Asplenium platyneuron* grows on an old stone wall near the stream and the surrounding woods yield *Thelypteris palustris* (unusually fertile,) *Osmunda cinnamomea*, *O. regalis*, *Equisetum arvense*, *Dennstaedtia punctilobula*, and both forms of *Botrychium dissectum* with magnificent fertile spikes.

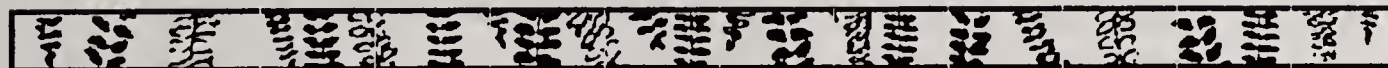
The Jersey Pinelands are not home to a large fern flora -- most of the habitat is too open and dry – but several pteridophytes found here are incredibly interesting, rare, or, in the case of *Schizaea*, unique in the state. The Pinelands are home to rare species of animals as well. The northern pine snake and the endangered Pine Barrens tree frog are but two examples. A long ride back to Baltimore was filled with “fern” memories. Thank you, Jim Montgomery.

References:

Eiger, Joan. 1956. A hybrid *Lycopodium*. Biological Review, C.C.N.Y. 18:17-22.

Harshberger, John W. 1916. *The Vegetation of the New Jersey Pine Barrens* (Dover reprint, 1970.) Dover Publ., New York.

Montgomery, James D. and David E. Fairbrothers. 1992. *New Jersey Ferns and Fern-Allies*. Rutgers Univ. Press, New Brunswick, New Jersey. (Illustrations used for this trip report are by K.L. John-Alder from this book.)



Athyrium Filix-Femina *continued from page 7*

Utah the two seem to be quite distinct and are easily distinguished." More recently Windham seems to recognize this subspecies as well.

Culture: The fern garden seems somehow incomplete without the Lady Ferns to grace the more protected areas. The European species as well as the Western Lady Fern are quite well behaved, but should be given room to expand slowly. (*Ed. note - It can sow itself quite freely west of the Cascade mountains.*) The Northern Lady Fern, however, may be a little too adventurous for a small garden, and The Southern Lady Fern is probably too rampant a spreader. Prudence should be used before introducing it to a small-scale garden. The Lady Ferns should be given good light and protection from hot dry winds as the fronds can easily be damaged. A moist humusy soil is a must if they are to flourish. All Lady Ferns are prized for their lacy light green fronds and should be found in every garden collection in at least one form or another.

References:

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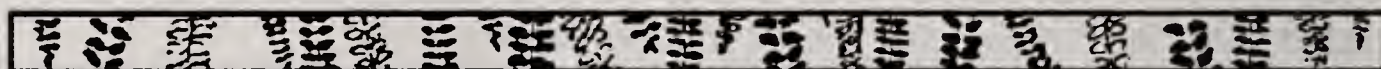
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Ferns of Utah, 1944, Seville Flowers, University of Utah, Salt Lake City



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1 Rare fern	N Moist soil	B Tree Fern
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W Wet soil	J Epiphytic	Q Hard 2 grow

S P O R E L I S T

GENUS	SPECIES	CVR	Z	PK	SZEGRO	ORIG	DONOR
Adiantum	aleuticum		4	25	12 TKGELNV	PacNW Jap	98/206 96/10 9.
Adiantum	pedatum		2	25	20 ENSZK	US Jap	98/164 97/173,;
Adiantum	Pedatum	Miss Sharples	3	2	NSK	US	97/173
Arachniodes	simplicior		7	14	30 EKTZM	Easia	98/156 97/181 ;
Arachniodes	simplicior	variegata	7	10	30 SNEM	Easia	97/182 96/146 ;
Asplenium	adulterinum		5	4	8 RZD	EurTibet	98/45 94/9, 12
Asplenium	Bachacarpin		6	5	2	Canada	98/210
Asplenium	bulbiferum		6	2	36 NJZHES	AusNZ	98/164 97/9, 2 ;
Asplenium	cuneifolium		6	16	RL	Eur	97/45
Asplenium	fontanum		5	4	5 ZNRSG	Eur	98/12 97/12, 9, .
Asplenium	hallbergii		7	3	8 NSK	Mex	98/173
Asplenium	oblongifolium	Crested Beauty	7	2	30 ZTGOESNK Nz	Nz	97/196
Asplenium	officinarium		5	2	6 ADU	India, Af, Eur	97/192
Asplenium	onopteris		6	3	8 1RZKNT	Eur	98/9 96/45, 185
Asplenium	platyneuron		4	15	18 DAENT	E USA	98/156 97/173, ;
Asplenium	rhizophyllum		4	5	6 ANTKO	NAm	97/173 96/8 94,
Asplenium	ruta-muraria		4	9	5 QANU	N. Hem	97/192 96/45, 9
Asplenium	Scleroprium		6	1	KSNE	NZ	97/196
Asplenium	scolopendrium	Americanum	6	20	12 ANSKO	NHem	97/173 94/150, .
Asplenium	scolopendrium	AmericanumForkedFr	6	20	12 ANSKO	NHem	98/173

Asplenium	scolopendrium		6	8	12	ANSKO	NHem	98/166 97/173 :
Asplenium	scolopendrium	crested	6	5	12	ANSKO	N Hem	98/173
Asplenium	scolopendrium	cristatum	6	5	12	ANSKO	N Hem	97/173
Asplenium	Scolopendrium	Supra marginatum	6	5	12	ANSKO	NHem	97/155
Asplenium	scolopendrium	Undulatum	6	4	12	ANSKO	NHem	97/173
Asplenium	septentrionale		4	2	6	1QZDTK	NHem	98/9 96/45 94/1
Asplenium	sp	Gordon Foster	5	3	2			98/173
Asplenium	trichomanes	quadrivalens .	2	10	9	ANTE	Eur	98/45 95/9 94/1
Asplenium	trichomanes		2	10	9	ANTKOE	Cosmo	98/8 98/12 97/1
Asplenium	trichomanes	lucanum	2	9	9	ANTE	Austria	98/45
Asplenium	trichomanes	Melzeranum	2	8	9	ANTE	Austria	98/45
Asplenium	trichomanes	Incisum	2	6	9	ANTE	Eur	98/45 96/158 94
Asplenium	trichomanes	Incisum Molle	2	6	9	ANTE	Eur	97/45
Asplenium	trichomanes	Incisum Moule	2	6	9	ANTE	Eur	97/45
Asplenium	trichomanes	Pachyrachis	2	6	9	1ANTE	Czech	98/45
Asplenium	trichomanes	Lovisianum	2	2	9	ANTKOE	Switz	98/45
Asplenium	viride		4	1	6	QARNK	N. Hem	98/9 96/45, 185
Asplenium	x lusaticum		5	4	9	13 ANTKOE	Germ	98/45
Asplenium	x poscharskyanum		5	3			Germ	97/45
Asplenium	x praetmissum		5	2			Slovakia	97/45
Asplenosorus	x ebenoides		7	5	12	1ANRKS	NAM	97/173 96/36, 1:
Athyrium	distentifolium		3	8	24	RTVKN	far N Hem	97/9 95/12, 8
Athyrium	filix-femina	cristatum	3	15	48	ZNTKEV	N. HEM	98/156 98/206 :
Athyrium	filix-femina	rubellum	3	8	48	ZNTKEV	N. HEM	98/156 97/181, :
Athyrium	filix-femina	Angustum	3	5	48	ZNTKEV	N. HEM	97/200 96/129
Athyrium	filix-femina		3	5	48	ZNTKEV	N. HEM	98/206 97/9, 2
Athyrium	filix-femina	Frizelliae	3	4	48	ZNTKEV	N. HEM	98/173 97/80 9:
Athyrium	filix-femina	Plumosum Penny	3	2	36	ZNTKOV	N. HEM	97/45

Athyrium	filix-femina	Victoriae	3	2	48 ZNTKEO	N. HEM	98/156 97/156
Athyrium	filix-femina	cvr?	3	1	48 ZNTKEV	N. HEM	97/173
Athyrium	filix-femina	Plumosum Axminster	3	1	36 2ZNTKOV	N. HEM	98/206
Athyrium	Goerangianum Pic Samarai Swords		5	5	24 E	Easia	97/173
Athyrium	niponicum	Pictum	3	60	18 ZNTVE	Easia	98/206 97/181
Athyrium	niponicum		4	1	18 ZNTV	Easia	98/156 96/181
Athyrium	Obovatum		5	4			97/173
Athyrium	otophorum		4	20	24 SKENTV	Easia	98/206, 173 97/
Athyrium	pyncocarpon		4	20	48 ANTVK	N Am	98/206 97/173
Athyrium	thelypteroides		3	5	36 TWZV	NHemS&Easia	98/206 97/108
Athyrium	vidalii		3	10	24 TKE	Ko, Jp, Tai	97/173 94/45 9
Athyrium	yokoscense		4	6	10 K	Kuriles, Easia	97/7 96/45 93/3
Athyrium ?	Unk.	Bradford Beauty	5	5	K		97/173
Blechnum	discolor		5	20	38 WTKN	NZ	97/162, 12
Blechnum	minus		6	20	40 WOTK	Aus, NZ	98/220 97/57, 1
Blechnum	minus x wattsii		6	5	12 WUK	AusNZ	98/220 97/57
Blechnum	penna-marina		5	12	9 GUOWRKE	SHem	97/193, 20, 12 9
Blechnum	spicant		6	30	28 ZESWYV	N. Hem. Pac nw	98/164 98/220
Blechnum	Wattsii		6	5	12 WUOSK	AusNZ	98/220 97/57, 1
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Botrychium	dissectum	obliquum	4	6	8 QLZTNK	N. Am	97/189, 195 93/
Botrychium \$\$\$	Virginianum		3	10	16 QZVSKM	NHem	97/195 95/8
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Cheilanthes	argentea		4	3	6 DUZK	Nasia, Siberia	97/173 96/150
Cheilanthes	Feei		5	1	8 QRADUO	NW N. Am	98/198 97/198,
Cheilanthes	lanosa		5	6	12 NSZKO	Se N. Am	98/8 98/173 97/
Cryptogramma	acrostichoides		2	10	10 ZURDAK	W US	97/10 92/97
Cryptogramma	Crispa		6	25	8 NUAK	EurWasiaAf	98/20 96/20, 18

Cyrtomium	falcatum		6	50	24	RTNEKO	E&Sasia	98/156 97/9 96/
Cyrtomium	falcatum	Litorale	6	3	24	2RTNEKO	E&Sasia	98/173
Cyrtomium	fortunei		5	50	24	ZNTKEO	JpChKor	98/164 97/182,
Cyrtomium	fortunei	intermedium	3	3	16	ZNTKO	JpChKor	98/173 94/135
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Cyrtomium	sp		5	2				97/192
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Cystopteris	protusa		5	4	16	NTEGK	E US	97/8 96/174, 15
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Cystopteris	tennesseensis		7	1				98/8
Deparia	Acrostichoides		3	20	36	TWZV	NHemS&Easia	97/198
Dicksonia \$\$\$	fibrosa		7	10	120	1BEONUK	NZ	98/162 97/9 94/
Diplazium	Acrostichoides		5	9		K	Ny	97/173
Diplazium	Lanceum	Crenata	7	3		2SN	ChiJpIndia Kr	98/173
Doodia	Aspera	Crested	6	7	15	2UNG	Aus, NZ, Norf is	98/210
Doodia	media	Rubra	7	20	10	2TWNZRK	AusNZ Norfolk Island	98/210
Dryopteris	abbreviata		5	8			Eur	97/45
Dryopteris	affinis	Persica	4	30	48	SNTKE	Eur SWasia	98/45 92/26
Dryopteris	affinis	borreri	3	20	48	SNK	Eur SWasia	97/173 96/45 9
Dryopteris	affinis	cambrensis	3	20	36	SNVTKE	Eur SWasia	98/45 97/10 96/
Dryopteris	affinis	affinis	3	12	48	SNTKE	Eur SWasia	1
Dryopteris	affinis	disjuncta	3	6	48	SNTKE	Eur SWasia	98/45 92/9, 26
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Dryopteris	affinis	Angustata Cristata	3	1	24	SNTKE	Eur SWasia	98/206
Dryopteris	affinis	Crispa	3	1	48	SNTKE	Eur SWasia	97/173
Dryopteris	affinis x wallichiana ?		5	6				97/12

Dryopteris	amurensis		3	3	24	1SWKE	Jp, Siberia	98/45 94/12
Dryopteris	atrata		6	30	18	NTK	Easia	98/156 97/9 96/
Dryopteris	austriaca	Recurvata	3	8	48	OSNK	N. Hem	97/173
Dryopteris	bissetiana		3	8	24	SZKEN	Jp	98/156 97/156;
Dryopteris	blanfordii		3	20	36	K	Him	98/45 95/12 93/
Dryopteris	cambrensis		6	7			Eng	97/188 92/24, 24
Dryopteris	carthusiana		2	10	30	TZWKE	Europe, N Am	97/173, 83 96/4;
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Dryopteris	clintoniana		3	15	40	WSKE	E NA	98/216 □ 97/17
Dryopteris	clintoniana	hexaploid fertile	3	4	40	WSKE	E NA	97/173
Dryopteris	Clintoniana x Intermedia		3	15	48	TNVKE	N Am	97/173
Dryopteris	crassirhizoma		3	10	36	TVKE	Ko, Ch, Jp	1
Dryopteris	cristata		3	60	36	ZWSKE	N. HEM	98/45 97/197, 10
Dryopteris	cycadina		5	40	30	NUKE	Easia	97/7, 197, 173 9
Dryopteris	cystolepidota	nipponensis	7	3	10	NSK	JapCh	98/45
Dryopteris	cystolepidota		7	3	10	NSK	JapCh	98/45 94/38
Dryopteris	decipiens		5	4	19	EKNTR	RyukChJp	97/173 92/36
Dryopteris	dickinsii	Incisa	3	2	24		ChJp	97/45
Dryopteris	dilatata	Crispa Whiteside	4	26	36	WTOSK	N Hem	1
Dryopteris	dilatata		4	25	40	WTOSKE	NHem, GreenInd	97/173, 9 95/12,
Dryopteris	dilatata	Jimmy Dyce	4	17	20	WTOSKE	NHem.	97/197, 182 95/
Dryopteris	dilatata	Lepodota cristata	4	15	18	WTOSKE	N Hem	97/164 94/25 9;
Dryopteris	dilatata	Recurvata	4	6	36	WTOSKE	N Hem	98/206 97/182;
Dryopteris	erythrosora		5	34	28	TNKO	ChJpKr	98/156 98/164
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Dryopteris	filix-mas	LinearisPolydactyla	3	30	48	ZSNVE	N Hem	97/182, 173, 200

Dryopteris	filix-mas	Barnesii	3	20	36	ZSNVE	N Hem	98/156 97/173 :
Dryopteris	filix-mas	Cristata	3	4	8	ZSNVE	N Hem	97/173
Dryopteris	Angustatum		3	1	60	ZSNVE	N Hem	98/164 96/27 9:
Dryopteris	filix-mas		3	1	48	ZSNVE	N Hem	97/173
Dryopteris	filix-mas x affinis	undulata robusta	3	15	48	TNVKE	N Am	98/8 97/173,83
Dryopteris	goldiana		3	15	48	TNVKE	N Am	97/173
Dryopteris	Goldiana x Clintoniana		3	10	24	EKTN	Jap	97/197, 10 92/9
Dryopteris	hondoensis		3	10	34	ZSNOEK	E N America,	97/173
Dryopteris	intermedia		3	50	24	NTKE	EasiaIndia	97/7, 173 96/15:
Dryopteris	lacera		5	1	20	ZNEK	NIndiaCh Eur	98/45 97/36
Dryopteris	Lepidoda		5	15	46	ASEWK	SE US	97/181 96/156 :
Dryopteris	ludoviciana		6	1	46	ASEWK	SE US	98/156 98/216 :
Dryopteris	ludoviciana	x Hybrid	6	50	25	ESNOK	NE N. Am	98/8 97/182,83
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Dryopteris	Nomegatae		7	3	24	NSKE	ChJp	97/45 94/148
Dryopteris	nipponensis		6	9	24	EKNT	Jap	97/36, 10 96/18
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Dryopteris	pseudo-filix mas		5	6	36	NSKE	Japan	97/173, 10 94/9:
Dryopteris	purpurella		5	10	24	KENTO	SikkimJap	98/156 98/45 9:
Dryopteris	pycnopteroides		6	4			Pakisatn	98/45 97/7
Dryopteris	Ramosa x Stewatrii		6	25	36	1KNTE	Eur	98/156 98/36 9:
Dryopteris	remota		4	5	K			97/80
Dryopteris	Sacrosancta		6	5	18		Ala?	97/156
Dryopteris	Sarcastora		7	8	24	ZSENKO	Easia	98/156 98/164 :
Dryopteris	sieboldii		6	6	24	ZSNKO	Easia	97/10
Dryopteris	sieboldii	Incisum	6	5				97/191
Dryopteris	Sordidipes		7	15	24	ZN	N.A,Jp	97/182, 108 93/:
Dryopteris	spinulosa		3	40	48	K		98/45 96/153 9:
Dryopteris	stewartii		7	20	20			98/36 95/36,80
Dryopteris	sublacera		7					

Dryopteris	tokyoensis	5	2	30 EZSRN	Jp, Kor	97/173, 12, 10
Dryopteris	uniformis	5	20	30 ZNKOE	Easia	97/191 96/157
Dryopteris	varia	6	10	24 ZSNK	Sasia, Philipin	97/7 92/111
Dryopteris	villarii	5	20		Eur	98/156 96/45, 1
Dryopteris	wallichiana	5	3	40 SNKB	Pantropic	98/220 97/173,
Dryopteris	X complexa	3	12	36 ETVNK	Europe	98/45 97/7
Dryopteris	X complexa	3	12	36 ETVNK	Europe	98/45
Dryopteris	X complexa	4	4	36 ETNK	Europe	98/20897/156 9
Dryopteris	x Dowelii	5	5	60		97/173
Dryopteris	x tavelii	5	43	S	Eur	97/9 95/12
Equisetum	telmateia	7	10	70 QGWUVK	NHem	97/9 95/162
Gymnocarpium	dryopteris	2	70	12 ERSGV	NHem	98/164 97/1, 16
Gymnocarpium	robertianum	2	40	16 1ASEGNK	NHem	97/173 95/9 94/
Lygodium	palmatum	3	2	60 1CWZTQK	E.Nam	98/173 94/8
Matteuccia	struthiopteris	2	60	60 ZWSEVK	N. Hem	98/166, 211 96/
Osmunda	Japonica	3	20	32 EYZWSOK	E&SAsia, Philipp.	97/176 95/110
Osmunda	cinnamomea	3	10	60 WZVEK	NAmEasia	97/144, 176
Osmunda	claytoniana	2	5	60 ZWSVKE	NAm	97/176, 200 96/
Osmunda	regalis	3	10	72 ZWSVK	SAm	97/194
Pellaea	atropurpurea	3	5	16 UADEK	C&N.A.	98/8 97/173 96
Pellaea	glabella	7	1	10 1AUDK	USA, Can	98/8 98/198
Pellaea	rotundifolia	7	13	6 DTZK	NZ	
Phegopteris	connectilis	5	40	16 SNGVK	N.Hem	97/7, 198 96/8, 1
Phyllitis	scolopendrium	4	10	24 ARNSKOE	N.Hem	98/164 97/7, 12
Polypodium	Appalachianum	5	10	K	Ne US	97/83
Polypodium	glycyrrhiza	5	8	20 JSRHN	NW N.Am	97/7, 1 96/10 93
Polypodium	scouleri	7	2	14 TNJR	W.NAm	97/7 96/1 95/10
Polypodium	vulgare	4	3	12 NTJK	Cosmo	98/45 97/7
	Bifido-cristatum					

Polypodium	vulgare	Pulcherrimum	6	3	14	NTJK	N Hem	98/45
Polystichum	acrostichoides		3	40	28	SNOK	N.Am	98/164 □ 97/83,
Polystichum	Acrostichoides	Forked pinnae	3	10	28	SNOK	N.Am	97/108
Polystichum	acrostichoides	Cristata	4	1	30	SNAOK	N.Am	97/173 98/216
Polystichum	acrostichoides x andersonii		3	4	28	SNOK	N.Am	98/45
Polystichum	aculeatum		4	30	30	EASRGN	Eur, N India	97/188, 36, 12, 4
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Polystichum	andersonii		6	40	36	1WSRK	NW N.Am	98/12 97/173 9
Polystichum	braunii		3	60	28	SNOKE	N. Hem	98/8 97/188, 17
Polystichum	californicum		7	12	30	RNT	California	97/170, 4 94/1
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Polystichum	setiferum	proliferum	6	6	40	NT	Eur	97/173
Polystichum	setiferum	proliferum	5	5	40	TN	Eur	97/164 95/2 94/
Polystichum	squarrosum		7	10	18	NTK	EurIndiaHimalaya	97/45 94/36 93/
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